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10/791,140

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Ge Wang

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EXAMINER

LUONG, PETER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/791,140	Applicant(s) WANG ET AL.	
	Examiner Peter Luong	Art Unit 4175	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/01/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-90 is/are pending in the application.
- 4a) Of the above claim(s) 31-90 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/24/04, 7/18/05, and 11/23/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-30 in the reply filed on 11/01/2007 is acknowledged.
2. Claims 31-90 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11/01/2007.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claims 14-15 recite the limitation "registering the first reconstructed image with the detected optical signals before producing the second reconstructed image". The step of registering is not found in the specifications.

Claim 15 recites the limitation "a landmark-based method, a land-mark free method" which is not found in the specifications.

Claims 29-30 recite the limitation "registers the first reconstructed image with the detected optical signals before the second reconstructed image is produced".

Claim 30 recites the limitation "a landmark-based method, a land-mark free method" which is not found in the specifications. The step of registering is not found in the specifications.

Claim Objections

4. Claims 4 and 19 are objected to because of the following informalities: in the body of the claim, “reconstructed for multiple” should be --reconstructed from multiple--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation “the reconstructed image volume” in the 2nd paragraph in the body of the claim. There is insufficient antecedent basis for this limitation in the claim. It is unclear which image is referred to since claim 1 recites a “first” and “second reconstructed image”. Furthermore, the “first” or “second reconstructed image” does not recite limitation “volume”.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Warren et al. (Warren et al., “Combined Ultrasound and Fluorescence Spectroscopy for

Physico-Chemical Imaging of Atherosclerosis". IEEE Transactions on Biomedical Engineering 42(2) (1995): 121-132).

With respect to claims 1 and 16, as best understood by the Examiner, the publication of Warren et al. discloses a method and system for reconstructing an image of an object (abstract, line 1) comprising imaging the object using a first imaging modality (first imaging modality found on page 125, col. 1, lines 12-13) to produce a first reconstructed image (figure 2, image reconstructed on oscilloscope), mapping optical properties (optical properties found on page 123, section B, lines 1-4) of the object to the reconstructed image volume (page 126, col. 1, lines 54-58, data mapped to pixels), and detecting optical signals emitted from the object using a second imaging modality (page 124, col. 2, lines 15-17) to produce a second reconstructed image (page 126, col. 1, lines 54-58), based on the mapped optical properties (page 126, col. 1, lines 54-58). Warren et al. also discloses a library of optical properties of the object (page 122, col. 2, lines 45-47 and Table 1) and a processor for mapping the optical properties of the object to the first reconstructed image (PC, figure 2).

With respect to claims 2 and 17, Warren et al. discloses wherein the first reconstructed image shows two or three dimensional structural details of the object (A-mode image, page 125, col. 1, lines 12-13).

With respect to claims 3, 5, 9, 18, 20, and 24, Warren et al. discloses wherein the second reconstructed image shows cross-sectional or volumetric views of the object or quantitative features of underlying source distributions of the object (page 122, col. 1, lines 27-30).

With respect to claims 4 and 19, Warren et al. discloses wherein the second reconstructed image is reconstructed for multiple types of source distributions with various spectral characteristics (it is inherent that there would be multiple sources for a cross-sectional image to be reconstructed, page 122, col. 1, lines 27-30, furthermore, it is also inherent for the sources to have varying spectral characteristics, such as wavelengths).

With respect to claims 6 and 21, Warren et al. discloses wherein the second reconstructed image is reconstructed using an iterative or analytical approach (page 123, section C).

With respect to claim 7 and 22, Warren et al. discloses wherein the step of detecting optical signals uses sensors (page 124, col. 2, lines 15-17).

With respect to claims 8 and 23, Warren et al. discloses wherein the step of detecting optical signals also uses optical path components (page 124, col. 2, lines 28-30).

With respect to claims 10 and 25, Warren et al. discloses wherein the optical properties include at least one of absorption coefficients, scattering coefficients, scattering anisotropy, indices of refraction, and features of underlying sources (page 123, section B, lines 1-4, and Table 1 shows scattering coefficients).

With respect to claims 11 and 26, Warren et al. discloses wherein the first imaging modality includes at least one of x-ray computed tomography, micro computed tomography, magnetic resonance imaging, and ultrasound (page 125, col. 1, lines 12-13).

With respect to claims 12 and 27, Warren et al. discloses wherein the second imaging modality includes at least one bioluminescent tomography and fluorescent tomography (page 124, col. 2, lines 15-17).

With respect to claims 13 and 28, Warren et al. discloses segmenting the first reconstructed image into regions (A-mode imaging, page 125, col. 1, lines 12-13), wherein the step of mapping maps the optical properties to each segmented region of the image (page 126, col. 1, lines 54-58, mapped to pixels).

With respect to claim 14 and 29, Warren et al. discloses registering the first reconstructed image with the detected optical signals before producing the second reconstructed image (page 126, col. 1, lines 54-58).

With respect to claims 15 and 30, Warren et al. discloses wherein the step of registration uses a landmark-based method, a landmark free method, or an optical surface imager method (the catheter images the interior surface of an artery, page 125, col. 1, line 22-23).

9. Claims 1-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Townsend et al (US 6,490,476).

With respect to claims 1 and 16, as best understood by the Examiner, the patent of Townsend et al. discloses a method and system for reconstructing an image of an object (abstract) comprising imaging the object using a first imaging modality (12) to produce a first reconstructed image (col. 13, lines 22-24), mapping optical properties (optical properties found on col. 13, lines 24-25) of the object to the reconstructed image volume (it is well known in the art that CT images are mappings of optical properties,

col. 13, lines 22-24), and detecting optical signals emitted from the object using a second imaging modality (14) to produce a second reconstructed image (col. 13, lines 31-32), based on the mapped optical properties (col. 13, lines 29-32). Townsend et al. also discloses a library of optical properties of the object (col. 22, lines 54-56) and a processor for mapping the optical properties of the object to the first reconstructed image (col. 13, line 23).

With respect to claims 2 and 17, Townsend et al. discloses wherein the first reconstructed image shows two or three dimensional structural details of the object (figure 5a).

With respect to claims 3, 5, 9, 18, 20, and 24, Townsend et al. discloses wherein the second reconstructed image shows cross-sectional or volumetric views of the object or quantitative features of underlying source distributions of the object (figure 12b).

With respect to claim 4 and 19, Townsend et al. discloses wherein the second reconstructed image is reconstructed for multiple types of source distributions with various spectral characteristics (col. 16, lines 48-52).

With respect to claims 6 and 21, Townsend et al. discloses wherein the second reconstructed image is reconstructed using an iterative or analytical approach (col. 13, lines 45-48).

With respect to claim 7 and 22, Townsend et al. discloses wherein the step of detecting optical signals uses sensors (12, col. 12, lines 37-40).

With respect to claims 8 and 23, Townsend et al. discloses wherein the step of detecting optical signals also uses optical path components (collimated detectors, col. 16, lines 48-52).

With respect to claims 10 and 25, Townsend et al. discloses wherein the optical properties include at least one of absorption coefficients, scattering coefficients, scattering anisotropy, indices of refraction, and features of underlying sources (col. 13, lines 24-25 and 29-30).

With respect to claims 11 and 26, Townsend et al. discloses wherein the first imaging modality includes at least one of x-ray computed tomography, micro computed tomography, magnetic resonance imaging, and ultrasound (12).

With respect to claims 12 and 27, Townsend et al. discloses wherein the second imaging modality includes at least one bioluminescent tomography and fluorescent tomography (14).

With respect to claims 13 and 28, Townsend et al. discloses segmenting the first reconstructed image into regions (col. 17, lines 24-27).

With respect to claims 14 and 29, Townsend et al. discloses registering the first reconstructed image with the detected optical signals before producing the second reconstructed image (col. 13, lines 22-30).

With respect to claims 15 and 30, Townsend et al. discloses wherein the step of registering uses a landmark-based method, a landmark free method, or an optical surface imager method (col. 10, lines 28-30).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The publication of Peter et al. discloses a dual-modality emission micro-imaging tomography system. The patent of Kojima et al. and Nutt et al. disclose a combined PET and x-ray CT tomography system. The patent of Cable et al. discloses a multi-mode bioluminescence imaging system. The publication of Zhu discloses a combined NIR and ultrasound imaging system. The patent of Grodzins et al. discloses a combined x-ray and optical spectroscopy system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Luong whose telephone number is (571) 270-1609. The examiner can normally be reached on Monday - Thursday, 7:30 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrence Till can be reached on (571) 272-1280. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/P.L./

/Brian D Nash/
Primary Examiner, Art Unit 3721